INL Fossil Energy Technologies

The Idaho National Laboratory's Fossil Energy Department is a group that applies scientific and engineering principles to produce and convert hydrocarbon materials to refined energy products while minimizing economic, safety and environmental impacts of the conversion processes.

Capable Science and Engineering

The Department consists of about 20 scientists and engineers trained in petroleum engineering, mechanical engineering, geophysics, and chemical engineering. We have a solid reputation in the scientific and industrial peer community due, in part, to a staff with national and international recognition. They include two INL Fellows, R&D 100 award winners, adjunct faculty at numerous universities and committee persons, and chairs for a number of national and international journals and scientific organizations. Many of the staff have extensive industrial experience.

These capabilities are combined with numerous other scientific and engineering skills at the laboratory to support over 50 fossil energy research and subsurface science crosscutting projects. The main thrusts of the Department are: Exploration and Production, Reservoir and Environmental Technologies, Oil & Gas Sensors and Controls, Natural Gas, Oil & Gas & Coal Processing, and Hydrogen for National Energy missions.

The ultimate aim of the Department is to secure sources of energy to power America's energy future.

Group Managed Programs

The Oil and Gas Sensors and Control group conducts research to provide solutions to a number of industry-identified problems related to downhole instrumentation. Projects include research on a downhole seismic source for look-ahead prediction, a high void fraction multiphase meter, a large downhole seismic sensor array, oil and gas production sensors and controls, and single well seismic imaging. Research projects also seek to transfer oil and gas technology to the characterization and treatment of subsurface science environmental contamination problems.

The Exploration and Production group conducts research to provide solutions to a number of industry-identified problems that relate to oil and gas exploration, production and transportation. Projects include research on locating and characterizing methane hydrates (characterization, reservoir modeling, geophysical logging tools, and thermogenic/biogenic sources of methane hydrates), advanced coiled tubing flaw defect identification and transportation of hydrocarbon indicators in the Four Corners region.

The Reservoir and Environmental Technologies group conducts research that characterizes oil, gas, and coal reservoirs, how they can be

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most efficiently produced, and how the depleted reservoirs can be used for sequestration purposes. We have multiple projects related to enhanced oil recovery (microbial produced surfactants and improved water flooding). We are developing technologies to treat such environmental problems as vadose zone accumulations of benzene, toluene, ethylene and xylene (BTEX). Simple, low-cost bioreactors are being developed for treating produced water and gas in oil field and offshore platform environments for removal of sulfides. Several projects to physically or biologically capture CO_2 from flue gas and sequester the CO_2 in geological repositories are underway. Projects to evaluate the environmental impact of water produced from coal bed methane have started. The group is starting to focus on horizontal drilling and flow control technologies.

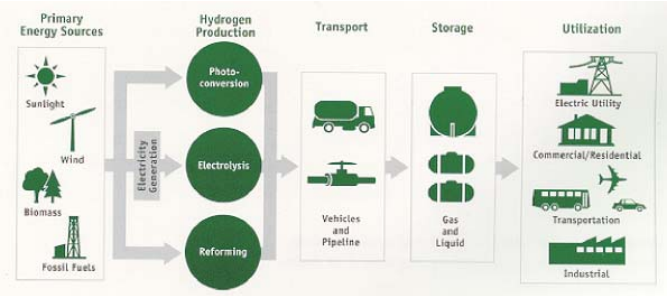
The Oil & Gas, and Coal Processing group conducts studies and experimental evaluations of new technologies to improve the efficiency, economics, and environmental acceptability for the conversion of oil, gas, and coal to refined hydrocarbon products and electrical power. Because of the decreasing quality of crude oil being produced worldwide, we explore novel approaches for treating petroleum to make refineries more able to process these lower-grade materials—with reduced energy costs and environmental liabilities. We also research gas to liquids processes to produce environmentally clean liquid fuels. A major thrust in this area is to transfer a coal plant to industry where it will simultaneously produce electricity and serve as a large-scale test-bed for clean coal technologies.

The Hydrogen group conducts research to develop and commercialize technologies related to production, infrastructure, and utilization of hydrogen fuel. Current projects include reforming of diesel to make hydrogen, reforming of natural gas to make hydrogen, using nuclear power to thermochemically split water into hydrogen, studies to develop new carriers for hydrogen use, and augmentation of engines (including fuel cells) to use hydrogen.

The Department is actively evaluating potential areas including supporting the development of technologies to drill for oil and gas in the ultra-deep waters of the Gulf of Mexico and development of technologies to support clean coal programs (Vision 21 and the Clean Coal Power Initiative). It also supports expanded access to federal lands in the western U.S. for the exploration and production of oil and gas, and for technologies to develop integral data transmission and sensing technologies for pipelines.

The Department collaborates with many industrial partners to achieve government and private sector energy goals and priorities.

Hydrogen is emerging as an energy dynamo.



For more information

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